

IT COULDN'T HAPPEN

(A DESCRIPTION OF FIVE UNUSUAL FATAL MINE ACCIDENTS)

BY D. S. KINGERY

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UNITED STATES DEPARTMENT OF THE INTERIOR
Douglas McKay, Secretary
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D. S. Kingery^{1/}

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^{1/} Mining engineer, Bureau of Mines, Washington, D. C.

INTRODUCTION

This study describes five fatal accidents so unusual in occurrence that the chain of circumstances bringing them about may never be duplicated. The intent of this publication is to illustrate that everyone working underground is subjected, at all times, to definite inherent mining hazards and that safety devices, though provided, often are ineffective or not used. It is hoped that a study of these fatal accidents in bituminous-coal mines will show workers and safety engineers that nothing can be taken for granted. Safety planning with continuous study can prevent these unusual accidents as well as the routine recurring types, which cause the majority of coal-mining injuries.

The treacherous, fatalistic philosophy that "it can't happen to me" or that "when my time's up I'll get it regardless of what I do," still prevails among individuals and even safety engineers. The individual or safety man who believes in luck as applied to safety should not read any further, since this study was written for the sincere, safety-minded individual who accepts the prevention of all accidents as a challenge to his knowledge, initiative, persuasiveness, and salesmanship.

REPORT OF FATAL ACCIDENT 1 (Fig. 1)^{2/}

The victim, a check weighman working at his regular job on the main shaft bottom, was fatally injured when 50 loaded cars ran away and struck the rear end of a coal trip being dumped. The weighroom in which the victim worked was made of light, corrugated-metal sheets suspended by hooks from a pipe installed in the roof, and fastened to a 2- by 4-inch plank laid on the floor. The main partition was parallel to, and approximately 24 inches from, the track. The victim was 43 years old and had nearly 6 years experience as a check weighman working at this same location.

Transportation System in Effect

Cars of coal were gathered from the working faces and hauled to the main shaft bottom with 20- and 30-ton trolley locomotives. Traffic along the haulage roads was controlled by a dispatcher using trolley phones and telephones. The rolling stock and haulage track were considered to be in good condition. Ample clearance space was maintained, and shelter holes were provided where necessary along haulage roads. Loaded trips of coal were brought onto the main bottom from tracks on both sides of the weighroom and rotary dump through chutes south of the weigh office and pulled far enough to clear switches. After a trip reached the bottom, the bottom crew set brakes to hold the loaded cars and then split the trip into sections of about 20 cars before the locomotive was disconnected. The locomotive then was switched at

^{2/} This accident was investigated in 1953 by J. W. Holcomb, Federal mine inspector.

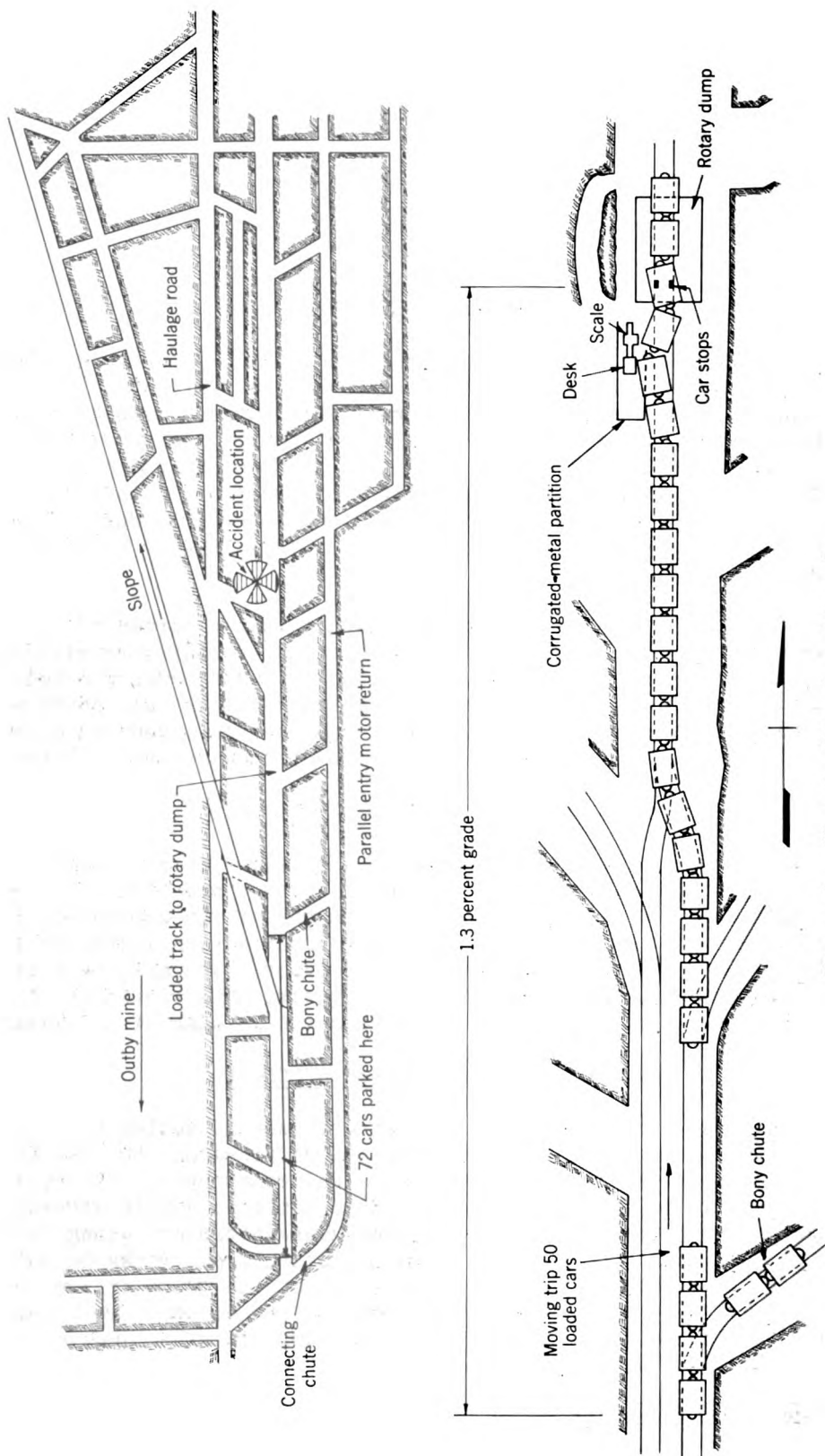


Figure 1. - Sketch of fatal accident 1.

the main connecting chute approximately 900 feet south of the dump to one of the parallel entries and returned past the dump to pick up empty cars for the return trip.

The 20 car sections were dropped down a 1.3-percent grade toward the rotary dump to a retarder by 2 car droppers and the trip rider. Cars normally fed into the dump by gravity, and two cars were dumped simultaneously. The coal dropped into bins from where skips hoisted it up the shaft to the surface plant.

Description of Accident

About 12:30 p. m. all cars of coal on the bottom had been dumped, and the main-line motor pulled a 72-car trip of loads through the chute onto the loaded car track about 160 feet outby the dump. The trip was stopped at a point where the first car just cleared the connecting chute and the last car was at the frog of the switch to the bony chute. One of the bottom crew commented that pulling the trip this far was not necessary, since the loaded track on the bottom held 80 cars. Twenty-two cars were cut from the trip by car droppers and the trip rider. One car dropper set approximately 16 brakes on the remaining 50-car trip, while the other 2 men began to drop the 22 cars to the rotary dump. The coal inspectors cut off the last two cars of the part trip going to the dump, and these were placed in the bony chute. The remaining 20 cars were pushed to the stopblocks at the dump, and it was stated that the cars were virtually stopped when they reached the retarders. The first two cars were weighed and entered the dump. At this time one of the car droppers who had remained at the bony chute heard a noise and saw the standing 50-car trip beginning to move toward the dump. He ran toward the trip to set more brakes and shouted a warning; but, because of the noise of the dumping operations and the distance, no one heard him. He failed to stop the runaway cars, and they struck the rear end of the trip of cars at the dump. The force of the collision pushed the third car across the stopblocks and partly into the dump, and the first car was pushed part way out of the dump stalling the dump. The fourth, fifth, and sixth cars were derailed in a zigzag manner, and the fifth car pushed through into the weigh office, crushing the victim between the car and the desk where he was working.

The weigh boss who worked at a desk and scale a few feet inby the victim's was not aware that anything was wrong until he heard the window glass in the partition break. He immediately looked for a place of safety and as he turned saw the victim with both hands on the desk trying to climb up on it.

After the confusion subsided, the weigh boss noticed that the victim was standing on his left leg trying to free his right leg, which was still caught. He freed himself and started to walk toward the door, and, when asked how he was, answered, "Ok." He was taken to the surface, and an ambulance immediately carried him to the hospital. He died 4 days later from the injuries he had received.

During the investigation, the motorman was asked if he had pulled the trip too close to the main connecting chute, necessitating a shove to clear the switch for the locomotive. He stated that it was not necessary to shove the trip, since he had left ample room at the switch.

Cause of Accident

The 50-car trip moved approximately 375 feet before striking the other cars. Since the motorman stated that he did not push the trip, it must be assumed that, after the motor had been uncoupled, the 34 outby cars, without brakes set, started

moving, and the accumulated slack between these cars permitted enough momentum to build up to overcome braking action and knock some brakes loose from the 16 cars on which brakes had been set.

Comments

The system of operation, excepting minor changes, had been in effect for many years. All practices had become routine, and it had not occurred to anyone connected with dumping or handling cars that the operation was hazardous.

Since the accident, a signal system for controlling trips on the bottom has been installed. Red and green lights have been set near the connecting chute so that the motorman will keep coupled to the trip when the red light is on. An electric derail has been installed on the loaded track near the bony chute to derail trips that get away.

REPORT OF FATAL ACCIDENT 2 (Fig. 2)^{3/}

The second-shift electrical foreman was killed while being hoisted to the surface, when the cage he was riding was struck by a storage-battery locomotive and a loaded materials car that ran away and fell down the auxiliary shaft. The victim was on a routine errand, and the cage was approximately 50 feet above the bottom landing when the accident occurred.

General Information

The auxiliary shaft was used to handle men and materials. Entrance to it was through a concrete enclosure, 70 feet 6 inches long, containing an airlock large enough to hold 1 supply car and the 5-ton storage-battery locomotive. A hand-operated stopblock was installed on the track 35 feet 6 inches from the shaft opening, and rules governing the use of this stopblock had been established. Supplies for the mine were loaded on steel flat-top trucks of special design. These supply trucks were 15 feet 9 inches long and 6 feet 6 inches wide. Stakes were inserted in slots along the sides, ends, and floor to provide an enclosure and to support various kinds of material. A surface motor supply crew was employed to load these material trucks, haul, and deliver the loaded trucks on the cage, and remove empty trucks from the cage.

Description of Accident

The motor crew had sent the day's requirement of supplies into the mine, except one car of calcium chloride. They went to the supply yard, coupled the locomotive to the car of calcium chloride, pulled it out of the side switch, and were pushing it toward the shaft. The trip was brought to a stop by the locomotive brake to permit the trip rider to open the outside airlock door. When the operator began to open the power control on the locomotive to move the trip inside of the air lock, a short circuit inside the controller box caused a hot, bluish flame to flash out. The motorman quickly moved to dodge the flame, lost his balance, and fell off the rear end of the locomotive. His hand was on the controller handle when he fell, and he did not know if he pulled it open as he fell but thought it was possible. He called to the trip rider to pull the disconnect switch on the rear deck end. The trip rider ran after the locomotive, but as he overtook it the controller burst into flames for the second time, and the car hit the inside airlock door at about the

^{3/} This accident was investigated in 1954 by G. W. Hammons, Federal mine inspector.

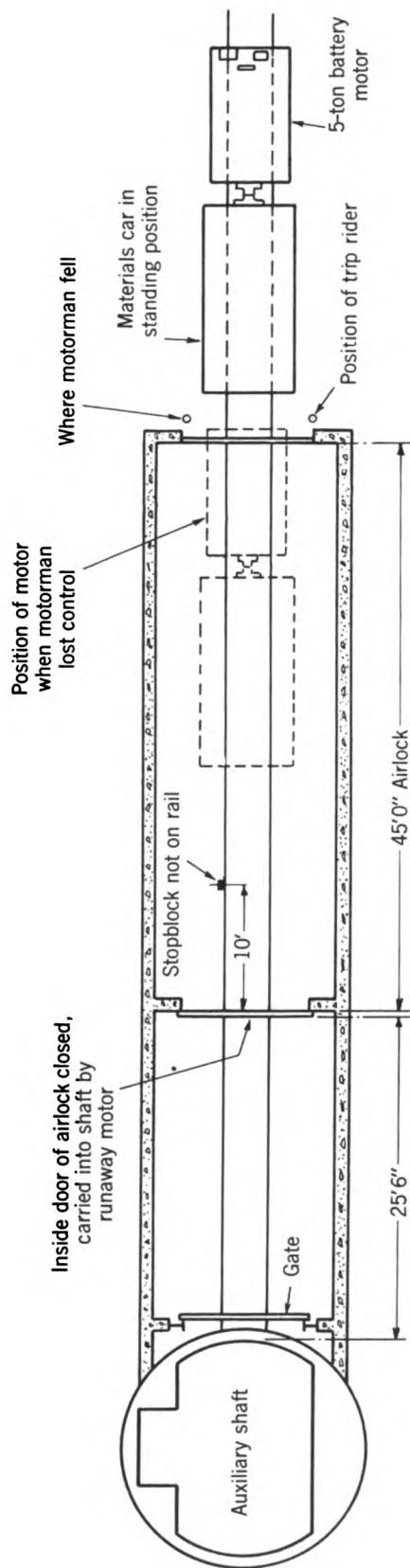


Figure 2. - Sketch of fatal accident 2.

same time. He was partly blinded from the flash and frightened from the excessive noise and stopped, assuming the trip had gone into the shaft. The locomotive and one car, carrying 1 ton of calcium chloride, continued into the shaft, fell on top of the cage about 50 feet from the bottom, and fatally crushed the victim.

During the investigation the single stopblock was off the rail, and it could not be determined if the block had been properly set or not. The motorman also reported that he had not previously experienced trouble with the locomotive.

Comments

It was evident that the stopblock either was not set or was inadequate for the job. Precautions had been taken to prevent such an accident as this, since the stopblock was provided and a rule promulgated to govern its use. When the emergency occurred, although such an eventuality had been foreseen, the protection, either because of mechanical or human failure, was insufficient to prevent loss of life and serious property damage.

REPORT OF FATAL ACCIDENT 3 (Fig. 3)^{4/}

A pumper working on a connection in the main pumproom was killed by a fall of roof. The pumproom in which the victim was working was 22 feet long, 12 feet wide, and 9 feet high and was constructed of solid concrete blocks extending from the bottom to a hard shale roof. Pumping equipment consisted of 1 centrifugal pump rated at 1,640 g.p.m., driven by a 200-hp. a.c. motor with necessary switchboard facilities. The victim was 63 years old and had 35 years mining experience, 20 years of which was pumping. There were no witnesses to the accident.

General Information Pertinent to Accident

The roof in the mine consists of a drawslate of varying thickness overlying the coal bed. Above this drawslate is 48 inches of dark, hard shale, and above this, laminated shale and sandstone, which form the main roof. Occasional slips, rolls, and clay veins are encountered, but none were present in the vicinity where the accident occurred. In the pumproom, the roof had been taken down to the hard blue shale, which, based upon past experiences, was accepted as excellent roof. No roof support was installed, consequently the unsupported span of roof was the 12 feet between walls.

The borehole serving the pumproom was drilled approximately 2 years before the accident and was 400 feet deep. Owing to the highly acid condition of the water, a 10-inch-diameter borehole was drilled with a 6-inch metal casing installed, and the space around the casing was grouted with cement. This procedure, it was believed, would prolong the life of the borehole; assuming that the metal casing was eroded, water would be confined by the cement grout and would continue to flow without permeating the surrounding strata. A 10-foot section of rubber-lined, 6-inch pipe was connected from the bottom of the borehole to the pump.

Description of Accident

The day-shift pumper started the pump at 8:30 a.m. and stopped the pump at 9:10 a.m. when the sump was dry. He then began to remove the elbow, which was to be replaced and which was connected to the rubber-lined, 10-foot discharge section. This

^{4/} This accident was investigated in 1953, by F. E. Riley, Federal coal-mine inspector.

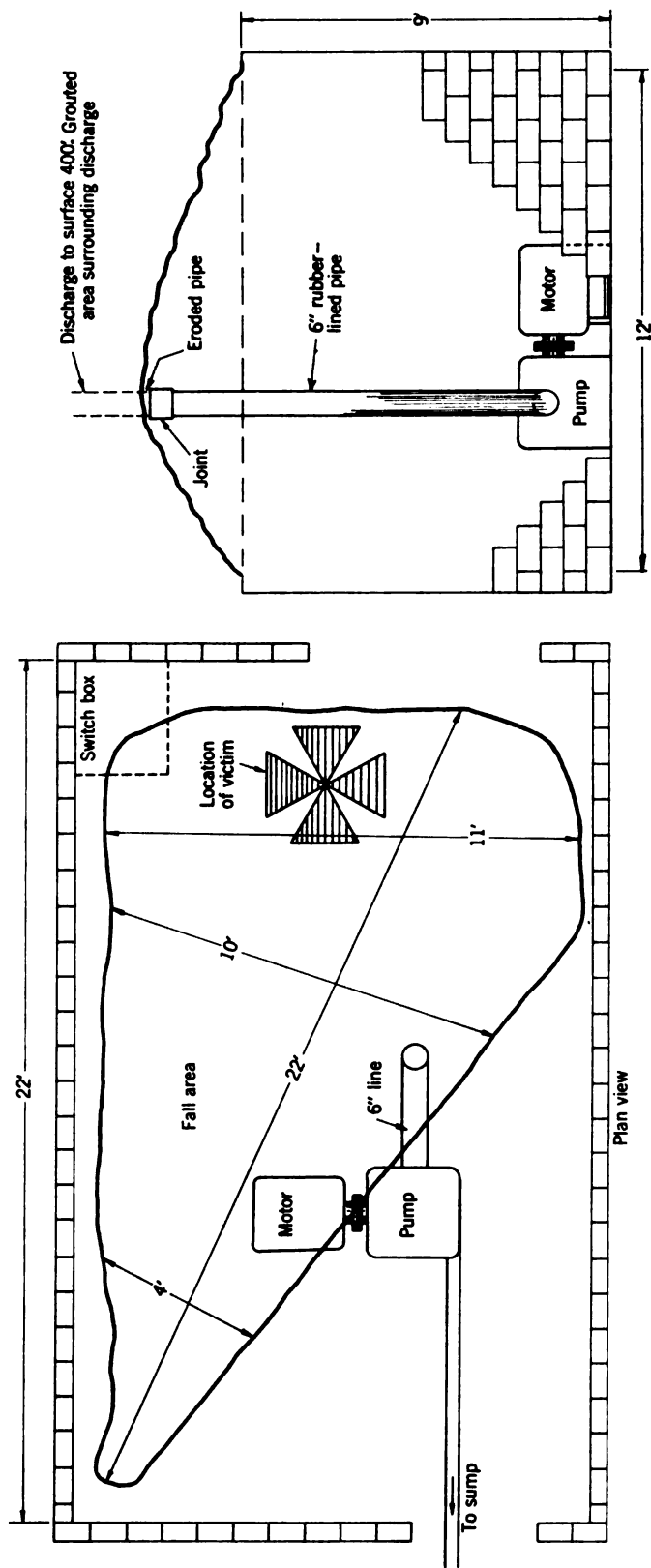


Figure 3. - Sketch of fatal accident 3.

work was continued throughout the shift, which ended at 2:00 p.m. The victim (oncoming shift pumper) continued the work until 6:00 p.m. and had completed the installation, except the final connection to the drain valve and line. The shift foreman entered the pump room to make an examination about this time and was told that the final connection would be made shortly, then the pump would be started.

About 7:00 p.m. 4 maintenance men passing the pump room noticed the roof fall and stopped to investigate. The victim was discovered under fallen roof material near the entrance to the pumproom. At 7:15 p.m. the shift mine foreman arrived; water was dripping from the roof, and small pieces of rock were still falling. The fallen material, which struck the victim, averaged 4-1/2 feet long, 3 feet wide, and 1-1/2 feet thick. The overall fall was shaped like a pear, approximately 22 feet long, and 10 feet wide, with a maximum thickness of 30 inches.

Cause of Accident

During the investigation the grouting above the joint was found to be secure and thick enough, and the 10-foot section of rubber-lined pipe was in good condition, but acid water had eroded the 6-inch casing just above the connecting joint, about 30 inches above the roofline. The assumption is that very little grout reached this point or it was weak; after the 6-inch casing had been eroded, repeated pressure caused the water to penetrate the strata over the pumproom, permitting the roof to loosen and fall without warning.

Comments

This unusual accident was not foreseen by any representative of management or employee. The hard-shale roof was accepted as dependable, and support other than the walls of the pumproom was not considered necessary. It was expected that the 6-inch pipe would erode, but it was thought that the grout would protect against seepage into the strata. This accident proves that good roof is subject to change and should not be trusted without the safety factor provided by auxiliary supports.

REPORT OF FATAL ACCIDENT 4 (Fig. 4)^{5/}

The victim, a loading-machine operator, was fatally injured by a flying piece of sandstone, which was dislodged and propelled 107 feet when coal was blasted. The deceased had worked 26 years at the mine, the last 7 years as a loading-machine operator. According to reports, both the loading-machine operator and helper had been warned that blasting was in progress; the victim was operating a loading machine in a different entry but unfortunately was in direct line with the blast.

General Information

The mine is developed in a fairly flat coal bed that averages 70 inches thick. Permissible explosives fired with electric detonators and permissible shot-firing units were used for underground blasting. Coal was center-cut 9 feet before shooting, and the normal blasting charge was 6 sticks of explosives per hole. Four holes, drilled by the machine crew, were placed in each of the bottom and top benches. Regular shot firers were employed to charge and fire all shots. The practice when shooting was for the shot firer to select as many of the nearest available workmen as were considered necessary to give warning, remove men from adjacent places, and

^{5/} This accident was investigated, in 1954, by C. F. Kahre, Federal coal-mine inspector.

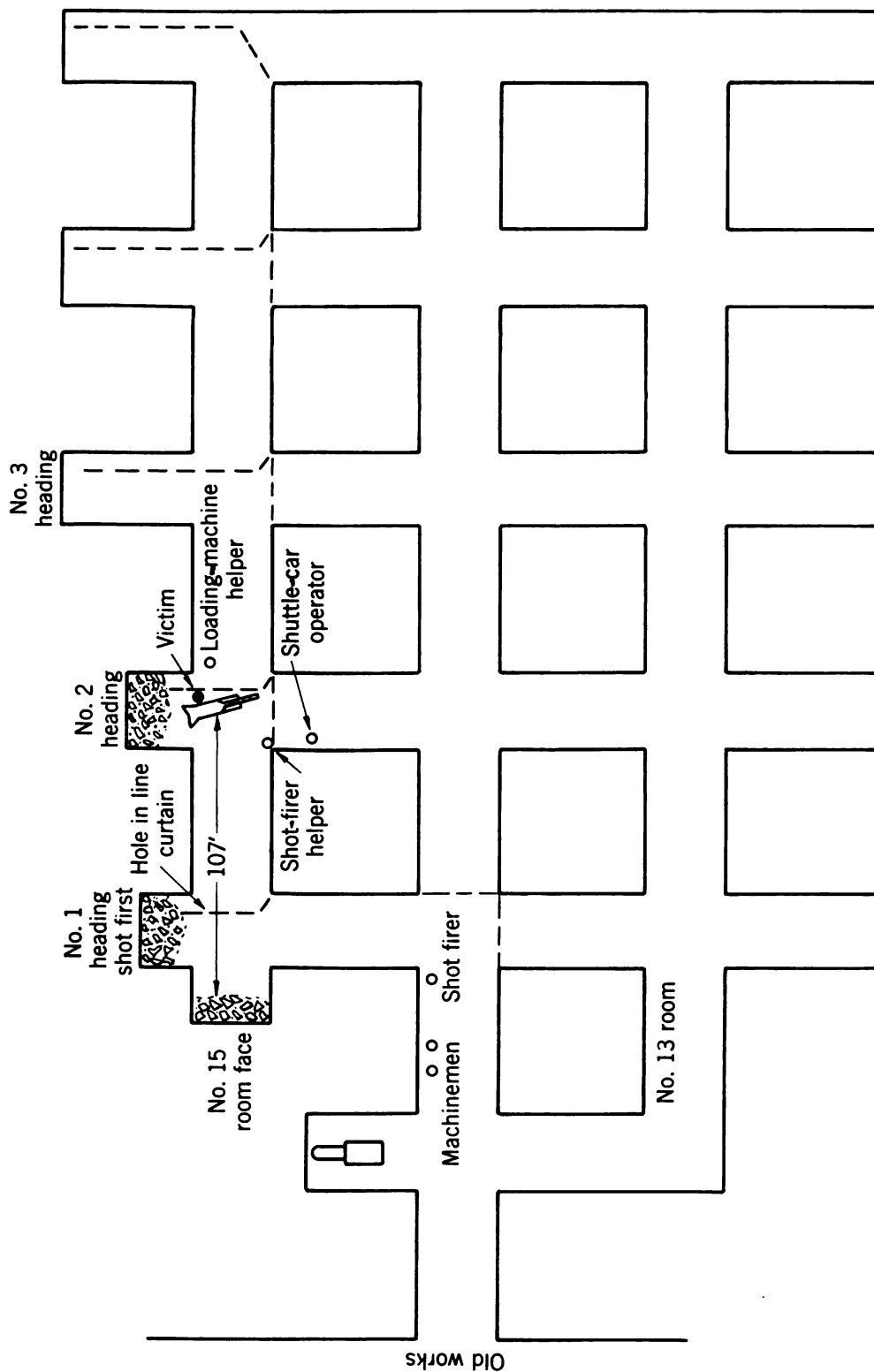


Figure 4. - Sketch of fatal accident 4.

guard entrances to the faces blasted. The blasting procedure, at the time of the accident, was to load all holes, then fire them one at a time, shooting the holes in the bottom bench first and then firing the top bench.

The immediate roof consisted of a hard, sandy shale varying in thickness from 1 to 4 feet; roof bolts were used exclusively in the section where the accident occurred. The development consisted of a block system, with rooms and entries at right angles. Line brattice was used where needed, and offtrack mining equipment was employed.

Description of Accident

The accident occurred in No. 2 heading, which was advanced 2 cuts off No. 15 room; consequently, the loading machine and victim were in direct line with the face of No. 15 room, 107 feet away. The shot firer had charged all holes in both No. 1 heading and the No. 15 room. He then summoned a helper to warn nearby workers and to guard the blasting area. It is reported that he warned the loading-machine crew, then fired the No. 1 heading, standing in the No. 2 heading, near the spot where the victim was subsequently struck. He then moved to the No. 14 room and proceeded to fire the bottom shots in No. 15 room. During this blasting his helper was to guard the No. 2 heading and was placed just outby the No. 15 room and No. 2 heading intersection. It is assumed that the loading-machine crew was aware that No. 15 room was being blasted. The same procedure was followed when firing the top holes as when firing the bottom bench; but, from the conflicting statements, it was not possible to definitely determine if the victim and his helper were specifically warned before the top bench was blasted. Probably they assumed that shooting had been completed and went back to work.

When the top holes were fired, a piece of sandstone 2-1/4 inches long, 2 inches wide, and 7/8 inch thick, weighing 6 ounces, was dislodged and propelled 107 feet, passing through the line curtain in No. 1 heading, and struck the victim, who was operating a loading machine. The force of the sandstone missile was so great that it struck the victim's hard hat and penetrated his skull.

Comments

This accident occurred through a series of human failures. Certainly the hazard was known, and a routine warning system had been established. Whether the victim had been specifically warned or whether he thought the blasting was finished or he considered that he was in a safe place could not be determined. This accident vividly shows that nothing can be taken for granted; in the majority of similar situations this accident would not occur, however, the necessary safety precautions were lacking, which in this instance cost a life.

REPORT OF FATAL ACCIDENT 5 (Fig. 5)^{6/}

This accident involved a collision between mainline haulage motors equipped with modern trolley-phone communications and operating under the direction of a dispatcher. The victim, a surveyor, was actually an innocent visitor riding in the cab of one of the locomotives. Both motormen were the regularly assigned men, were considered experienced, and knew the transportation system in effect at the time. The victim was riding the locomotive on authorization from the mine manager.

^{6/} This accident was investigated in 1953 by Frank Beck, Federal coal-mine inspector.

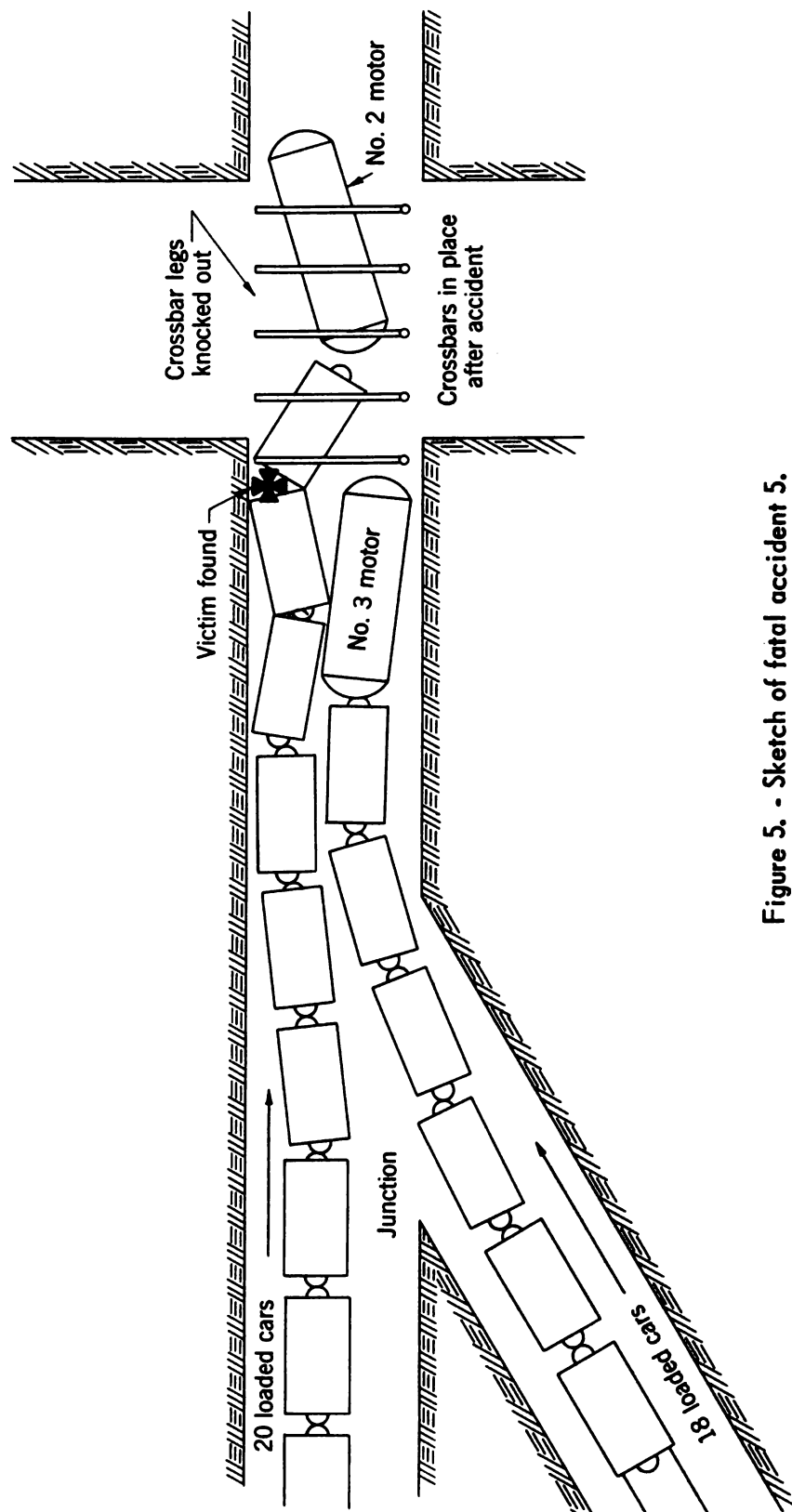


Figure 5. - Sketch of fatal accident 5.

General Information

A room-and-pillar panel system of mining was followed, with pillars not extracted. The roof at the scene of the accident was supported with roof bolts, with five crossbars set at a wide place for additional support. Face transportation was offtrack; shuttle cars discharged into belt conveyors, which conveyed the coal to cross-entry loading stations from where 8-ton, drop-bottom mine cars were used. Fifteen-ton trolley locomotives were used for main haulage to the shaft bottom.

The locomotives were equipped with both hydraulic and mechanical hand-operated brakes, trolley phones, good lights, and bells. At the time of the investigation, it was determined that locomotives and accessories were in good operating condition.

Double-track haulage was provided along one set of main entries; however, it was necessary for loaded trips to enter or cross at two places before reaching the bottom dump. Mine tracks were considered properly installed and maintained.

Three motors were used for main line haulage, No. 1 and No. 2 locomotives normally passed on the double track, whereas No. 3 met either 1 or 2 at a junction near the bottom. A standing operating rule required that all loaded trips obtain permission from the dispatcher before leaving the junction.

Description of Accident

The surveyor and his helper had finished their work and were riding out on the No. 2 locomotive. The victim was riding in the front cab with the trip rider, and the helper rode in the rear cab with the motorman. The trip passed an inbound empty trip at the regular meeting point and continued on to the junction with 20 loads. The No. 3 locomotive was also outbound with 18 loads, with the belt supervisor as a passenger. When nearing the junction the dispatcher was asked for the right of way, and the No. 3 locomotive was told to continue on.

The operator of the No. 2 locomotive, on which the victim was riding, stated that he attempted to contact the dispatcher before nearing the junction but received no answer. He further stated that when making a second attempt the trolley pole jumped off, and after getting the pole back on the wire he tried to stop the trip but was unable to do so. The No. 3 locomotive and trip was passing the crossover at that time, and the trips collided at the frog of the junction switch. The brakeman of the No. 3 locomotive unloaded at a wide spot; it was not known whether the victim was thrown off or jumped. He was found pinned under the wreckage between the first and second car from the locomotive. Some of the other men jumped and others could not explain how they got off. During the investigation the dispatcher stated that he did not hear the motorman who said that he had tried to contact him, and the surveyor's helper who was riding in the cab with the motorman stated that he did not see any attempt made to talk to the dispatcher.

Comments

This type of accident is not unusual; only the fact that the most modern means of communication were available and evidently were not used makes it extraordinary. Why the dispatcher did not answer or why no effort was made to contact the dispatcher could not be explained. It is evident that, although everything was available for safe operation, safety planning did not go far enough.

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